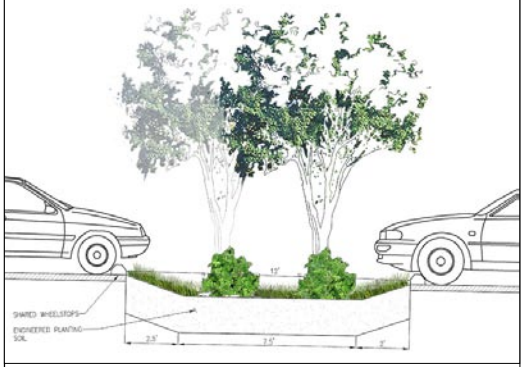
Seattle Public Utilities is introducing an innovative strategy for meeting landscaping and water quality requirements on parking lot projects. Called "green parking lots," this method will be explained in more depth in a new DPD Client Assistance Memo, CAM 507, due to be released later in 2005.

green parking lots

cost-effective designs that incorporate natural drainage strategies to protect local water bodies



A telescoping swale optimizes performance by allowing for a wider vegetated swale between compact car parking stalls and narrower swales between standard size parking stalls.

Green parking lots enhance the pedestrian experience for clients and customers by calming traffic and providing green islands in a sea of concrete or asphalt.

If you're looking for a cost-effective option for meeting landscaping and water quality requirements when building or redeveloping a parking lot, consider "going green." Green parking lots do much more than enhance the protection of nearby water bodies; they also enhance the pedestrian experience for clients and customers by calming traffic and providing green islands in a sea of concrete or asphalt.

By incorporating one or more natural drainage strategies, green parking lots reduce stormwater runoff discharged into local water bodies. Natural drainage strategies infiltrate stormwater on-site using permeable paving materials and/or natural drainage landscapes. Alone or together, these two strategies can be used to meet water quality and landscape requirements for parking lots.

Strategies: Permeable Pavements and Natural Drainage Landscapes

Permeable pavements include pavers, grid systems, porous asphalt and porous concrete. Pavers are available in pre-cast sections or individual units that fit together. They come in a variety of patterns and colors, and can be used to enhance traffic calming or the project's aesthetic. Grid or lattice systems are rigid plastic forms that are filled with gravel or soil and vegetation. Porous asphalt and porous concrete are similar to conventional asphalt and concrete in structure and form except that the fines have been removed. When installed over a drainage storage bed, these permeable pavements allow runoff storage and infiltration where soils permit. Surfaces that infiltrate may be eligible to be removed from area calculations for water quality requirements.

Natural drainage landscapes include vegetated swales, rain gardens and biofiltration planters that can improve water quality. Vegetated swales are open, linear channels in the landscape that can infiltrate and convey runoff to a discharge point. Rain gardens are shallow depressions in the landscape and are designed to intercept runoff. They are amended with bioengineered soil and vegetated with plants that are adapted to inundation of water and dry conditions. Biofiltration planters are excavated and backfilled with gravel and loamy sand and planted with shrubs and groundcover. Biofiltration planters are similar to rain gardens in function, but are designed to fit in a formal planter. All systems include an overflow feature such as a perforated pipe to convey excess drainage to another system or discharge point.

These natural drainage landscapes can help reduce the volume of runoff generated from parking lots and filter, infiltrate and store runoff for slower discharge. Permeable paving can reduce the amount of impermeable surfaces that require water treatment. If enough permeable paving is used, then the project may be under the City's required threshold for water quality treatment requirements. Natural drainage strategies may be used to meet both landscaping and water quality requirements. Parking lot areas that direct runoff to natural drainage strategies may be eligible for water quality credit if they are sized to filter or infiltrate the six-month storm event.

While doing their work to protect nearby bodies of water, these green parking lot technologies can also reduce capital and maintenance costs, as described in the case study on page 2.

CASE STUDY

Three Green Parking Lot Options Explored by Seattle Public Utilities

Three innovative options were developed for an existing parking lot to evaluate the feasibility and cost-effectiveness of creating green parking lots. Each green option considered using a combination of permeable pavements and natural drainage landscapes to provide water quality treatment for stormwater runoff. Interestingly, when the green options were compared to a conventional parking lot design under consideration, each green option was found to be equivalent or less expensive in capital and maintenance costs (see chart at right).

- **OPTION #1:** Combines three strategies: unit pavers along the "retail drive" and in the perimeter parking spaces, porous asphalt for the lower use zone, and telescoping swales distributed throughout the main parking lot. This option enhances water quality, allows partial infiltration, attenuates small storms, and contributes to the aesthetic of the parking lot design.
- **OPTION #2:** Uses two strategies: telescoping swales throughout the main parking lot and in the southwest parking area, and unit pavers along the "retail drive" and in the perimeter parking spaces. The benefits include enhanced water quality, some infiltration, attenuation of small storms, and an enhanced aesthetic.
- **OPTION #3:** Employs only the telescoping swale, which is used throughout the main parking lot and in the southwest lot. Catch basin water quality filters are also used. Enhanced water quality, some infiltration, attenuation of small storms, and a more pleasing aesthetic comprise the benefits from this option.

These options demonstrated that parking lots can infiltrate stormwater, enhance water quality, and attenuate small storms. They showed that different combinations of porous asphalt, unit pavers, rain gardens and telescoping swales can be used to meet the water quality treatment requirement. With the exception of the telescoping swale, each of these elements has specific technical requirements for its design and construction that can be found in the City's "Flow Control Technical Requirements Manual" (DPD Director's Rule 26-2000).

Green Parking Lots Provide Multiple Benefits

One or more green parking lot strategies can provide multiple benefits for your next parking lot project, including:

- preventing pollution at the source,
- removing pollutants before runoff is discharged,
- controlling discharge rates of stormwater runoff,
- providing a pleasant experience for clients and customers,
- saving capital and maintenance costs, and
- enhancing creek protection.

For more information, please contact:

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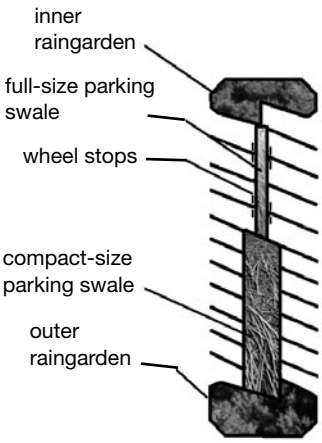

Telescoping Swale

The telescoping swales are a strategy specifically designed for this project and can be refined for other green parking lot projects. They have multiple sections that change in width over the length of the swale.

Cost Comparisons Favor Going Green

Although landscaping costs for the proposed green parking lot options are $20,000 more than the traditional landscaping costs, the capital costs for a traditional parking lot design are more than for the green. In addition, annual maintenance costs for traditional lots are higher based on four costs: sweeping, landscaping, water quality filter replacement, and drainage fees. The water quality filter replacement is estimated at $19,000 per year—almost the same amount as the landscaping proposed for the green parking lot options.

Cost Comparison: Traditional vs. Green Parking Lot Designs
(planning level estimate)

	Tradit'l Design	Option 1	Option 2	Option 3
Capital Cost (in Millions)	$6.60	$6.37	$6.10	$5.73
Maintenance Cost ($/Yr.)	$77,488	$63,188	$63,328	$63,328

For More Info

Look for DPD Client Assistance Memo (CAM) #507, scheduled to be released in June 2005, at **www.seattle.gov/dpd/camlist/camlist.asp**.

Learn more about Seattle Public Utilities Natural Drainage Systems at **www.seattle.gov/util/About_SPU**. Or visit DPD's Site Development resource at **www.seattle.gov/dpd/sitedev**.

To learn more about DPD's role in green building visit **www.seattle.gov/dpd/sustainability** or contact:

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